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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/325,099	06/03/1999	ALEXANDER SHVARTS	4498	2396

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EXAMINER	
FAN, CHIEH M	

ART UNIT	PAPER NUMBER
2634	22

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/325,099	SHVARTS ET AL.
	Examiner	Art Unit
	Chieh M Fan	2634

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/24/04*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,7-12,14 and 16-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7-12,14,16-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20/05242004*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the request for continued examination (RCE) filed on 5/24/04

1. The applicant amended claim 1 by replacing the word "operation" in line 12 with the same word "operation". The applicant's invention is unclear.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5, 7-10, 14, 16-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herzinger (EP 0,905,879) in view of Damgaard et al. (U.S. Patent No. 6,208,875, "Damgaard" hereinafter).

Regarding claim **1**, Herzinger discloses a translation loop modulator (see Fig. 2 and the English abstract) for transmission circuit in a communication system, said translation loop modulator comprising:

input modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an intermediate modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

comparator means ("FT1", "FT2", "PFD", "CP", "LF" and "HF-VCO" in Fig. 2) for receiving said intermediate modulated signal (output from "BP" in Fig. 2) and a reference signal ("f_{LO}" in Fig. 2) having a frequency of F_{LO}, and for producing an output transmission signal ("A" in Fig. 2) having a frequency of F_{OUT} responsive to said intermediate modulated signal and said reference signal, wherein said comparator means includes a first frequency divider unit ("FT1" in Fig. 2) for providing a to divide by m function and a second frequency divider unit ("FT2" in Fig. 2) for providing a divide by n function such that $F_{LO} = F_{OUT} / (1 - m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant), and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said input modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Herzinger does not teach that the translation loop modulator may be operated in a second mode such that $F_{LO} = F_{OUT} / (1 + m/n)$. That is, Herzinger does not teach the feature of dual band operation.

However, Damgaard teaches that there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality (col. 1, lines 30-35). Damgaard also teaches the dual band operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT} and RF_{LO}) to be either $RF_{OUT} - RF_{LO}$ or $RF_{LO} - RF_{OUT}$ (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, $RF_{LO} - RF_{OUT}$ is selected. When the mobile phone is operated in DCS mode, $RF_{OUT} - RF_{LO}$ is selected. (See col. 6, line 49 through col. 7, line 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the output of the mixer ("M1" in Fig. 2) of Herzinger to be either $RF_{VCO} - RF_{LO}$ or $RF_{LO} - RF_{VCO}$ such that the modulator of Herzinger may be operated in dual band (DCS mode and GSM mode) for the advantage of increasing system capacity. Note that the relationship $F_{LO} = F_{OUT} / (1 + m/n)$ is an inherent property when the DCS mode (i.e., $RF_{VCO} - RF_{LO}$) is selected. Such relationship may be derived by simple mathematical manipulations.

Regarding claim **5**, Herzinger also teaches an input port of said second frequency divider unit ("FT2" in Fig. 2) is coupled to said reference signal ("f_{LO}" output

from "LO" in Fig. 2), and an output port of said second frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **7**, Herzinger also teaches an input port of said first frequency divider unit ("FT1" in Fig. 2) is coupled to said intermediate modulated signal (the output from "BP" in Fig. 2), and said output port of said first frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **8**, Herzinger also teaches said feedback circuitry ("M1" and TP" in Fig. 2) includes a mixer device ("M1" in Fig. 2) including a first input port coupled to said output transmission signal ("A" in Fig. 2), a second input port coupled to said reference signal ("f_{LO}" in Fig. 2), and an output port coupled to said feedback signal ("f_{MO}" in Fig. 2).

Regarding claim **9**, Herzinger also teaches said reference signal is directly connected to said mixer device (as seen in Fig. 2, the reference signal "f_{LO}" is directly connected to the mixer device "M1").

Regarding claim **10**, Herzinger teaches a translation loop modulator (see Fig. 2 and the English abstract) for a transmission circuit in a communication system, said translation loop modulator comprising:

quadrature modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an quadrature modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

phase comparator means ("FT1", "FT2", "PFD", "CP", and "LF" in Fig. 2) for receiving said quadrature modulated signal (output from "BP" in Fig. 2) and a reference signal ("f_{LO}" in Fig. 2) having a frequency F_{LO}, and for producing a phase comparator signal (output from "LF" in Fig. 2) responsive to said quadrature modulated signal and said reference signal, said phase comparator means including a first frequency divider unit ("FT1" in Fig. 2) for providing a divide by m function and a second frequency divider unit ("FT2" in Fig. 2) for providing a divide by n function;

oscillator means ("HF-VCO" in Fig. 2) for receiving said phase comparator signal (output from "LF" in Fig. 2), and for producing an output transmission signal ("A" in Fig. 2) responsive to said phase comparator signal, said output transmission signal having a frequency F_{OUT} wherein $F_{OUT} = F_{LO}\ (1 - m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant); and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said quadrature modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Herzinger does not teach that the translation loop modulator may be operated in a second mode such that $F_{LO} = F_{OUT} / (1 + m/n)$. That is, Herzinger does not teach the feature of dual band operation.

However, Damgaard teaches that there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality (col. 1, lines 30-35). Damgaard also teaches the dual operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT} and RF_{LO}) to be either $RF_{OUT} – RF_{LO}$ or RF_{LO} - RF_{OUT} (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, RF_{LO} - RF_{OUT} is selected. When the mobile phone is operated in DCS mode, RF_{OUT} - RF_{LO} is selected. (See col. 6, line 49 through col. 7, line 8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the output of the mixer ("M1" in Fig. 2) of Herzinger to be either $RF_{VCO} – RF_{LO}$ or $RF_{LO} – RF_{VCO}$ such that the modulator of Herzinger may be operated in dual band (DCS mode and GSM mode) for the advantage of increasing system capacity. Note that the relationship $F_{LO} = F_{OUT} / (1 + m/n)$ is an inherent property when the DCS mode (i.e., $RF_{VCO} – RF_{LO}$) is selected. Such relationship may be derived by simple mathematical manipulations.

Regarding claim **14**, Herzinger also teaches an input port of said second frequency divider unit ("FT2" in Fig. 2) is coupled to said reference signal ("f_{LO}" output from "LO" in Fig. 2), and an output port of said second frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **16**, Herzinger also teaches an input port of said first frequency divider unit ("FT1" in Fig. 2) is coupled to said intermediate modulated signal (the output

from "BP" in Fig. 2), and an output port of said first frequency divider unit is coupled to a phase comparator device ("PFD" in Fig. 2).

Regarding claim **17**, Herzinger also teaches said feedback circuitry ("M1" and TP" in Fig. 2) includes a mixer device ("M1" in Fig. 2) including a first input port coupled to said output transmission signal ("A" in Fig. 2), a second input port coupled to said reference signal ("f_{LO}" in Fig. 2), and an output port coupled to said feedback signal ("f_{MO}" in Fig. 2).

Regarding claim **18**, Herzinger also teaches said reference signal is directly connected to said mixer device (as seen in Fig. 2, the reference signal "f_{LO}" is directly connected to the mixer device "M1").

Regarding claim **19**, Herzinger teaches a translation loop modulator (see Fig. 2 and the English abstract) for a transmission circuit in a communication system, said translation loop modulator comprising:

quadrature modulation means ("QM" and "BP" in Fig. 2) for receiving at least one input signal ("f_I" and "f_Q" in Fig. 2) that is representative of information to be modulated, for receiving a feedback signal ("f_{MO}" in Fig. 2), and for producing an quadrature modulated signal (output from "BP" in Fig. 2) responsive to said input signal and said feedback signal;

first frequency divider means ("FT1" in Fig. 2) for receiving said quadrature modulated signal (output from "BP" in Fig. 2), and for producing a first frequency divided signal (output from "FT1" in Fig. 2) responsive to said quadrature modulated signal such that said first frequency divider means provides a divide by m function;

second frequency divider means ("FT2" in Fig. 2) for receiving a reference signal ("f_{LO}" in Fig. 2), and for producing a second frequency divided signal ("f_{PD}" in Fig. 2) responsive to said reference signal such that said first frequency divider means provides a divide by n function;

phase comparator means ("PFD", "CP", and "LF" in Fig. 2) for receiving said first frequency divided signal and said second frequency divided signal, and for producing a phase comparator signal (output from "LF" in Fig. 2) responsive to said first and second frequency divided signals;

oscillator means ("HF-VCO" in Fig. 2) for receiving said phase comparator signal (output from "LF" in Fig. 2), and for producing an output transmission signal ("A" in Fig. 2) having a frequency F_{OUT} responsive to said phase comparator signal such that $F_{OUT} = F_{LO} (1 - m/n)$ (see the mathematical expression in col. 4, line 49, also see right column on page 3 of the English translation of DE 19743207 provided by the applicant); and

feedback circuitry ("M1" and "TP" in Fig. 2) coupled to said output transmission signal ("A" in Fig. 2), coupled to said reference signal ("f_{LO}" in Fig. 2) and coupled to said quadrature modulation means ("QM" and "BP" in Fig. 2), said feedback circuitry for producing said feedback signal ("f_{MO}" in Fig. 2) responsive to said output transmission signal and said reference signal.

Herzinger does not teach that the translation loop modulator may be operated in a second mode such that $F_{LO} = F_{OUT} / (1 + m/n)$. That is, Herzinger does not teach the feature of dual band operation.

However, Damgaard teaches that there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality (col. 1, lines 30-35). Damgaard also teaches the dual operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT} and RF_{LO}) to be either $RF_{OUT} - RF_{LO}$ or RF_{LO} - RF_{OUT} (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, RF_{LO} - RF_{OUT} is selected. When the mobile phone is operated in DCS mode, RF_{OUT} - RF_{LO} is selected. (See col. 6, line 49 through col. 7, line 8)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the output of the mixer ("M1" in Fig. 2) of Herzinger to be either $RF_{VCO} - RF_{LO}$ or $RF_{LO} - RF_{VCO}$ such that the modulator of Herzinger may be operated in dual band (DCS mode and GSM mode) for the advantage of increasing system capacity. Note that the relationship $F_{LO} = F_{OUT} / (1 + m/n)$ is an inherent property when the DCS mode (i.e., $RF_{VCO} - RF_{LO}$) is selected. Such relationship may be derived by simple mathematical manipulations.

Regarding claim **21**, as explained above in the rationale applied to claim 19, Herzinger in view of Damgaard may be operated in DCS mode (about 1800 MHz).

Regarding claim **22**, as explained above in the rationale applied to claim 19, Herzinger in view of Damgaard may be operated in GSM mode (about 900 MHz).

4. Claims 2, 3, 11, 12 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herzinger (EP 0,905,879) in view of Damgaard et al. (U.S. Patent No. 6,208,875, "Damgaard" hereinafter) as applied to claims 1, 5, 7-10, 14, 16-19, 21 and 22 above, and further in view of Jaffe (US Patent 5,130,670).

Regarding claim **2**, Herzinger in view of Damgaard teaches the claimed invention (see the rationale applied to claim 1 above) including an oscillating means ("LO" in Fig. 2 of Herzinger) for generating the reference signal ("f_{LO}" in Fig. 2 of Herzinger), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Regarding claim **3**, Jaffe teaches the claimed limitation "said reference loop modulator includes a fractional n synthesizer" because Jaffe teaches that the oscillating means 16' is a fractional n synthesizer (col. 16, lines 62-63).

Regarding claim **11**, Herzinger in view of Damgaard teaches the claimed invention (see the rationale applied to claim 10 above) including an oscillating means ("LO" in Fig. 2 of Herzinger) for generating the reference signal ("f_{LO}" in Fig. 2 of Herzinger), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Regarding claim **12**, Jaffe teaches the claimed limitation "said reference loop modulator includes a fractional n synthesizer" because Jaffe teaches that the oscillating means 16' is a fractional n synthesizer (col. 16, lines 62-63).

Regarding claim **20**, Herzinger in view of Damgaard teaches the claimed invention (see the rationale applied to claim 19 above) including an oscillating means ("LO" in Fig. 2 of Herzinger) for generating the reference signal ("f_{LO}" in Fig. 2 of

Herzinger), but fails to teach that the oscillating means is a reference loop modulator, i.e., a feedback loop configuration.

Jaffe teaches that an oscillating means (16' in Fig. 4) is implemented with a phase locked loop (52', 54', 56', 58', 66, 64', 60' and 62' in Fig. 7). The phase locked loop comprises a stability enhancement circuit (66 in Fig. 7) so as to generate a stable output oscillating signal.

It is desirable to generate a stable reference signal in the translation loop modulator of Herzinger so as to generate a stable output transmission signal ("A" in Fig. 2 of Herzinger). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the oscillating means of Herzinger with a phase locked loop, as taught by Jaffe, so as to generate a stable reference signal and consequently to generate a stable output transmission signal.

Drawings

5. The proposed drawings correction received on 11/14/03 have been approved. The applicant is reminded that the Office still has not received the replacement sheet of the drawing incorporating all of the previously submitted proposed drawing corrections

Response to Arguments

6. Applicant's arguments filed 5/24/04 have been fully considered but they are not persuasive.

(a) The applicant argues that there is no motivation to combine the Damgaard reference with the Herzinger reference. The Damgaard reference already provides a dual band system using a very different circuit and Herzinger provides a single band operation. There is no language in either patent that provides any motivation to combine the teachings of these patents to arrive at the applicant's invention (see page 12 of the amendment).

Examiner's response --- The applicant is correct that Herzinger only provides a single band operation. Since Herzinger's system only provides a single band operation, one of ordinary skill in the art would be motivated to modify Herzinger's system into a dual band operation so as to increase system capacity, such that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality. As indicated by the Examiner in this and previous Office Actions, such motivation is found in Damgaard because Damgaard teaches that *there is a need for mobile phones to operate with dual band transmissions to increase system capacity, so that the system could select between two transmission frequency bands depending upon which bandwidth is less saturated and could provide a better signal quality* (col. 1, lines 30-35). Damgaard also teaches the dual operation may be achieved by selecting the output of a mixer (with inputs RF_{OUT}

and RF_{LO}) to be either $RF_{OUT} – RF_{LO}$ or RF_{LO} - RF_{OUT} (col. 5, lines 53-62). When the mobile phone is operated in GSM mode, RF_{LO} - RF_{OUT} is selected. When the mobile phone is operated in DCS mode, RF_{OUT} - RF_{LO} is selected. (See col. 6, line 49 through col. 7, line 8). Therefore, the argument that there is no language in either patent that provides any motivation to combine the teachings of these patents is clearly not persuasive.

(b) The applicant also argues that any combination of these two references would not result in a system that uses a frequency plan as employed in the present application (see pages 12-13).

Examiner's response --- The logics of the applicant's argument appear to be (1) the applicant's circuit permits only two fixed VCOs to be employed and (2) the Damgaard reference uses either multiple VCOs or a tunable VCO (see pages 10-11 of the amendment or Broughton Declaration ¶11). Therefore, the cited references would not arrive at the claimed invention. However, the applicant's logics do not seem to be correct. Keep in mind that the goal of the present application is dual band (GSM and DCS) operation. Also keep in mind that the GSM system requires to operate in the frequency band 890-915 MHz and the DCS system requires to operate in the frequency band 1710-1785 MHz (see Damgaard, col. 3, lines 43-45). Therefore, the VCO 50 (which generates F_{OUT}) in Fig. 2 of the present application, in order to operate in dual band, must be tunable to switch between the two above-identified bands. The applicant is also referred to Fig. 3 of the present application, which clearly shows two VCOs 90, 92 and a switch 100. Further, the present application follows the relationship $F_{LO} = F_{OUT}$

/ (1 + m/n) or $F_{LO} = F_{OUT} / (1 - m/n)$. Since F_{OUT} must be tunable, either F_{LO} or m/n must be tunable. The values of m/n are limited since m and n are integers. Therefore, VCO 62 which generates F_{LO} is likely to be tunable in some occasions. Therefore, applicant's assertion that the applicant's circuit permits only two fixed VCOs to be employed is deemed to be incorrect. If only two fixed VCOs are employed, the present application would not be operable in dual band. In fact, the present will not be able to even operate in a single band because either GSM or DCS requires to be operated in a range of frequencies, not a single frequency. Moreover, the applicant is reminded that the claims of the present application only recite the relationships $F_{LO} = F_{OUT} / (1 + m/n)$ in one mode and $F_{LO} = F_{OUT} / (1 - m/n)$ in another mode. Whether F_{LO} or F_{OUT} is generated by tunable VCOs or fixed VCOs is beyond the scope of the claim.

Next, the Examiner will respond to the argument:

"(f)irst, the output of the bandpass filter 104 in Damgaard et al. is not switched by the filter 104, but rather by the switching network that precedes the filter 104, and this switching network includes multiple VCOs 111, 113 (or a tunable VCO) and a combiner or switch (also labeled 113 in Figure 3 of Damgaard et al.). Broughton Declaration ¶14. The bandpass filter 104 is a bandpass filter, not a switch. Broughton Declaration ¶15. For this reason alone, substituting the bandpass filter 104 of Damgaard et al. for the filter TP in Herzinger et al. would not achieve a dual band system as claimed. Broughton Declaration ¶15. In fact, the frequency plan in the circuit of Herzinger et al. does not even rely on the characteristics of the filter TP. Broughton Declaration ¶15." (See page 12-13 of the amendment).

As explained above, the present application also needs two VCOs or a tunable VCO in order to switch between GSM and DCS systems. Therefore, substituting the bandpass filter 104 of Damgaard et al. for the filter TP in Herzinger et al. would clearly achieve a dual band system of the present application. Further, the Examiner disagrees

with the applicant's statement "the frequency plan in the circuit of Herzinger et al. does not even rely on the characteristics of the filter TP". The bandpass filter TP may be used to filter out the component $f_{LO} - f_{VCO}$ or $f_{LO} - f_{VCO}$. Whether the filter TP is used to filter the component $f_{LO} - f_{VCO}$ or $f_{LO} - f_{VCO}$ clearly affects the operation of the circuit of Herzinger.

Next, the Examiner will respond to the argument:

"(s)econdly, the frequency plans of Herzinger et al. and Damgaard et al. are not compatible since Damgaard et al. requires changing both the LO and IF frequencies as well as their relationship, while Herzinger et al. requires that the relationship between the LO and IF frequencies be fixed. Broughton Declaration ¶16. There is no clear way, therefore, in which the teachings of these two references may be combined. Broughton Declaration ¶17." (See page 13 of the amendment).

Similar to the explanation above, since the system of Herzinger is operated in a GSM system, the VCO HF-VCO must be tunable so as to generate f_{VCO} in the frequency range of 890-915 MHz. Therefore, the signal entering the mixer M1 is also tunable. Nevertheless, regardless the input signals to the mixer are tunable or fixed, the bandpass filter TP maintains the relationship RF_{OUT} (corresponds to f_{VCO}) = RF_{LO} (corresponds to f_{LO}) – RF_{IF} for GSM. On the other hand, the bandpass filter 104 of Damgaard also maintains the relationships $RF_{OUT} = RF_{LO} + RF_{IF}$ for DCS and $RF_{OUT} = RF_{LO} - RF_{IF}$ for GSM regardless the signals input to the mixer are tunable or fixed. Therefore, after modifying the system of Herzinger by the teaching of Damgaard, the modified circuit still maintains the relationship $RF_{OUT} = RF_{LO} - RF_{IF}$ for GSM. Therefore, Herzinger and Damgaard are clearly compatible. The argument is not persuasive.

Further, the Examiner reiterates that it appears that the applicant considers the novelty of his invention lies in that the circuit may operate such that $RF_{OUT} = RF_{LO} + RF_{IF}$ for DCS and $RF_{OUT} = RF_{LO} - RF_{IF}$ for GSM. As explained above, such operation clearly has been taught by Damgarrd et al.

Based on the reasons above, it is believed the rejections should be maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (703) 305-0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chieh M Fan
Primary Examiner
Art Unit 2634

cmf
August 7, 2004